



PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference P13594PC/PC/RO	FOR FURTHER ACTION		See Form PCT/PEA/416
International application No. PCT/GB2004/002524	International filing date (day/month/year) 11.06.2004	Priority date (day/month/year) 14.06.2003	
International Patent Classification (IPC) or national classification and IPC A61B5/103, A61B19/00, G01L5/22			
Applicant UNIVERSITY OF DUNDEE et Al.			
1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36. 2. This REPORT consists of a total of 6 sheets, including this cover sheet. 3. This report is also accompanied by ANNEXES, comprising: a. <input checked="" type="checkbox"/> sent to the applicant and to the International Bureau a total of 7 sheets, as follows: <input checked="" type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions). <input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box. b. <input type="checkbox"/> (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).			
4. This report contains indications relating to the following items: <input checked="" type="checkbox"/> Box No. I Basis of the opinion <input type="checkbox"/> Box No. II Priority <input type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability <input type="checkbox"/> Box No. IV Lack of unity of invention <input checked="" type="checkbox"/> Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement <input type="checkbox"/> Box No. VI Certain documents cited <input type="checkbox"/> Box No. VII Certain defects in the international application <input checked="" type="checkbox"/> Box No. VIII Certain observations on the international application			
Date of submission of the demand 14.04.2005		Date of completion of this report 18.08.2005	
Name and mailing address of the international preliminary examining authority:  European Patent Office - P.B. 5818 Patentaan 2 NL-2280 HV Rijswijk - Pays Bas Tel. +31 70 340 - 2040 Tx: 31 651 epo nl Fax: +31 70 340 - 3016		Authorized Officer Neef, T Telephone No. +31 70 340-4653 	

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Box No. I Basis of the report

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.
- ☐ This report is based on translations from the original language into the following language , which is the language of a translation furnished for the purposes of:
- ☐ international search (under Rules 12.3 and 23.1(b))
 - ☐ publication of the international application (under Rule 12.4)
 - ☐ international preliminary examination (under Rules 55.2 and/or 55.3)
2. With regard to the **elements*** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:

Description, Pages

1-16 as originally filed

Claims, Numbers

1-39 received on 23.05.2005 with letter of 20.05.2005

Drawings, Sheets

14-44 as originally filed

- ☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing
3. ☐ The amendments have resulted in the cancellation of:
- ☐ the description, pages
 - ☐ the claims, Nos.
 - ☐ the drawings, sheets/figs
 - ☐ the sequence listing (*specify*):
 - ☐ any table(s) related to sequence listing (*specify*):
4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
- ☐ the description, pages
 - ☐ the claims, Nos.
 - ☐ the drawings, sheets/figs
 - ☐ the sequence listing (*specify*):
 - ☐ any table(s) related to sequence listing (*specify*):

* If item 4 applies, some or all of these sheets may be marked "superseded."

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Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	1-39
	No: Claims	
Inventive step (IS)	Yes: Claims	1-39
	No: Claims	
Industrial applicability (IA)	Yes: Claims	1-39
	No: Claims	

2. Citations and explanations (Rule 70.7):**see separate sheet**

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

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Re Item V

**Reasoned statement with regard to novelty, inventive step or industrial applicability;
citations and explanations supporting such statement**

1 Reference is made to the following documents:

D1: DE 43 32 580 A (DEUTSCHE AEROSPACE) 30 March 1995 (1995-03-30)

D2: DE 195 33 756 A (FRAUNHOFER GES FORSCHUNG) 13 March 1997 (1997-03-13)

2 The document D1 is regarded as being the closest prior art to the subject-matter of claim 1, and shows a tactile sensor assembly with a force transmission member (11,13) and a sensor (12; figures 1, 5, 7: piezoelectric), the force transmission member has a plurality of projections (13) for transmitting an applied force to the sensor, the sensor (12) detects the applied force and outputs an indicative signal (column 1, lines 23- 67).

Also shown is a palpation assembly with a palpation member (1, 2) and a tactile probe with movement relative to the object, both with above tactile sensor assembly and a corresponding method for using the tactile sensor assembly and the palpation assembly; therefore D1 is also the closest prior art to the subject-matter of apparatus claims 25, 31 and method claims 33 and 39.

The subject-matter of claims 1, 25, 31 differs from this known tactile sensor assembly in that :

- the sensor is a **capacitive sensor** that measures a capacitance value when **deformable projections** are deformed by the engagement with the sensor

In D1 the projections themselves are not deformed when pressure is applied, but the projection pushes on a chamber filled with elastic silicone and the membrane of the chamber (upon which the projection is carried) are deformed. Also the capacitive sensor described in the prior art cited by D1 (Suzuki et al.) does have a similar construction.

The subject-matter of claims 1, 25, 31, 33, 39 is therefore new (Article 33(2) PCT).

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The problem to be solved can be seen in providing an alternative construction for a pressure sensor.

The solution to this problem proposed in claim 1 and the other claims 25, 31, 33, 39 of the present application is considered as involving an inventive step (Article 33(3) PCT) for the following reasons:

D2 does disclose **deformable** projections (4, figures 1-3;) within a tactile sensor assembly (column 1, lines 8-20) with a force transmission member (3, 4) and a sensor (1, 2, E1, E2; figures 1- 3), however the sensor measures the resistance between electrodes, which decreases with increasing pressure and increasing deformation of the deformable projections, the sensor detects the applied force and outputs an indicative signal (column 3, lines 16-65; figures 2, 3; column 4, lines 6-60).

However D2 points away from the use of **capacitive** sensors (column 1, line 56-column 2, line 4)

Thus there is no disclosure or suggestion of a tactile sensor assembly with a force transmission member having a plurality of **deformable projections**, which are deformed by engagement with a **capacitive sensor**, which outputs a signal indicative thereof.

Therefore the subject-matter of claims 1, 25, 31, 33, 39 does involve an inventive step.

Claims 2- 24, 26- 30, 32, 34-38 are dependent on claims 1, 25, 31, 33 and as such also meet the requirements of the PCT with respect to novelty and inventive step.

Re Item VIII

Certain observations on the international application

- 1 The application does not meet the requirements of Article 6 PCT, because claims 1, 25, 31, 33, 39 are not clear and not concise.

- 1.1 Although apparatus claims 1, 25, 31 and method claims 33, 39 have been drafted as

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separate independent claims, they appear to relate effectively to the same subject-matter and to differ from each other only with regard to the definition of the subject-matter for which protection is sought and/or in respect of the terminology used for the features of that subject-matter, e.g. the tactile sensor assembly of claim 1 is also movable relative to an object to be measured. They seem not to involve alternative solutions to a particular problem which could not be covered by a single claim per category of claims, e.g. with the features of apparatus claims 25, 31 as dependent claims as both comprise all the features of claim 1, nor involve the different uses of an apparatus, nor relate to a plurality of inter-related products.

The aforementioned claims therefore lack conciseness and as such do not meet the requirements of Article 6 PCT, moreover, lack of clarity of the claims as a whole arises, since the plurality of independent claims makes it difficult, if not impossible, to determine the matter for which protection is sought, and places an undue burden on others seeking to establish the extent of the protection.

INTERNATIONAL SEARCH REPORT

GB2004/002524

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 A61B5/103 A61B19/00 G01L5/22

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 A61B G01L B25J G01N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the International search (name of data base and, where practical, search terms used)

EPO-Internal, INSPEC

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DE 43 32 580 A (DEUTSCHE AEROSPACE) 30 March 1995 (1995-03-30)	1-10,12, 13, 15-23, 25-39
Y	column 1, line 1 - column 2, line 4; figures 1,2,5,7 column 2, line 23 - column 4, line 46	11,14, 15,24
X	DE 195 33 756 A (FRAUNHOFER GES FORSCHUNG) 13 March 1997 (1997-03-13)	1,2,5-7, 9-15,24, 31-35, 37,38
Y	column 1, line 3 - column 3, line 65; figures 1-3	11,14, 15,24
A	column 4, line 12 - column 5, line 9	16-23, 25,30,39
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☒ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

* Special categories of cited documents:

A document defining the general state of the art which is not considered to be of particular relevance

E earlier document but published on or after the international filing date

L document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

O document referring to an oral disclosure, use, exhibition or other means

P document published prior to the international filing date but later than the priority date claimed

T later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

X document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

Y document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

Z document member of the same patent family

Date of the actual completion of the international search

20 September 2004

Date of mailing of the international search report

24/09/2004

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 851 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Neef, T

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 91/03705 A (NAT RES DEV) 21 March 1991 (1991-03-21) page 3, line 2 - page 5, line 3; figures 1-5	1,2, 8-10,12, 13, 16-21, 33,35,38
X	US 6 188 331 B1 (ZEE FULCO ET AL) 13 February 2001 (2001-02-13)	1,2,7,9, 10,13, 16,24, 31-35
A	column 1, line 40 - column 2, line 29; figures 1-4 column 2, line 51 - column 3, line 53	12,17-22
X	DE 42 43 832 A (DAIMLER BENZ AG) 30 June 1994 (1994-06-30)	1,2,5, 7-10,12, 13,16, 24-26, 31, 33-36,39
A	column 1, line 5 - column 3, line 7; figures 1-3	17-23, 27-30, 37,38
A	WO 00/13591 A (UNIV AMERICA CATHOLIC ; WANG Y JOSEPH (US); FREEDMAN MATTHEW T (US)) 16 March 2000 (2000-03-16) column 1, line 29 - column 2, line 3; figures 1-4 column 2, line 60 - column 3, line 64 column 4, line 19 - column 5, line 19	1,3,4, 20-22, 25-33, 36-39
A	US 2002/143275 A1 (SARVAZIAN ARMEN P ET AL) 3 October 2002 (2002-10-03) paragraph '0010! - paragraph '0011!; figures 1-3,6,8 paragraph '0027! - paragraph '0041! paragraph '0047! - paragraph '0049!	1,2, 9-21,25, 31-35, 37-39

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Patent document cited in search report		Publication date	Patent family member(s)	Publication date
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			US 5609607 A	11-03-1997
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			EP 1379171 A1	14-01-2004
			WO 02082998 A1	24-10-2002